

The Doe Run Company Herculaneum Slag Storage Proposed Final Remedy

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Barr Engineering Company
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Outstanding Issues

- Need to protect storage area from flooding
- Need to manage storm water from slag storage area
- Need to do so while allowing continued use of storage area
- Need to minimize slag storage area footprint in wetlands area
- Existing footprint option does not meet all objectives
- Existing footprint with storm water collection option reconciles issues while protecting the environment and complying with applicable environmental regulations

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Superfund

Engineer's Qualifications

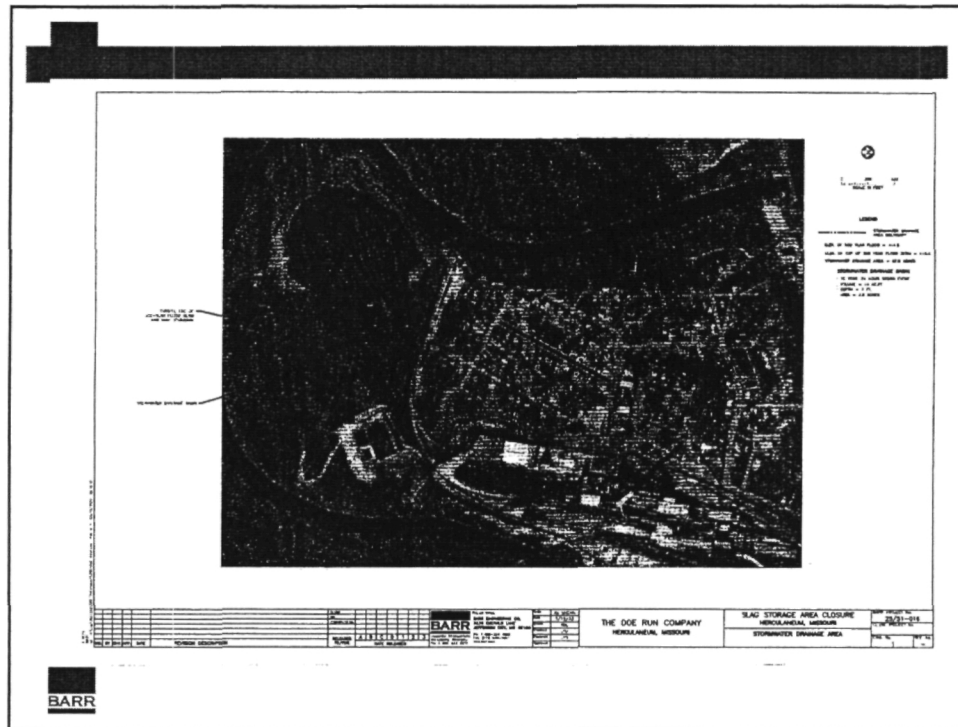
- BS and MS Civil Engineering – UMR Missouri P.E.
 - Designed, constructed and managed sanitary landfills
 - 14 years experience with MDNR in review and approval of permits, closure plans and remediation of solid and hazardous waste facilities
 - 10+ years in environmental consulting engineering
 - Overall 25+ years experience in design, operation, remediation and closure of waste management and mining facilities

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Slag Storage Area Background

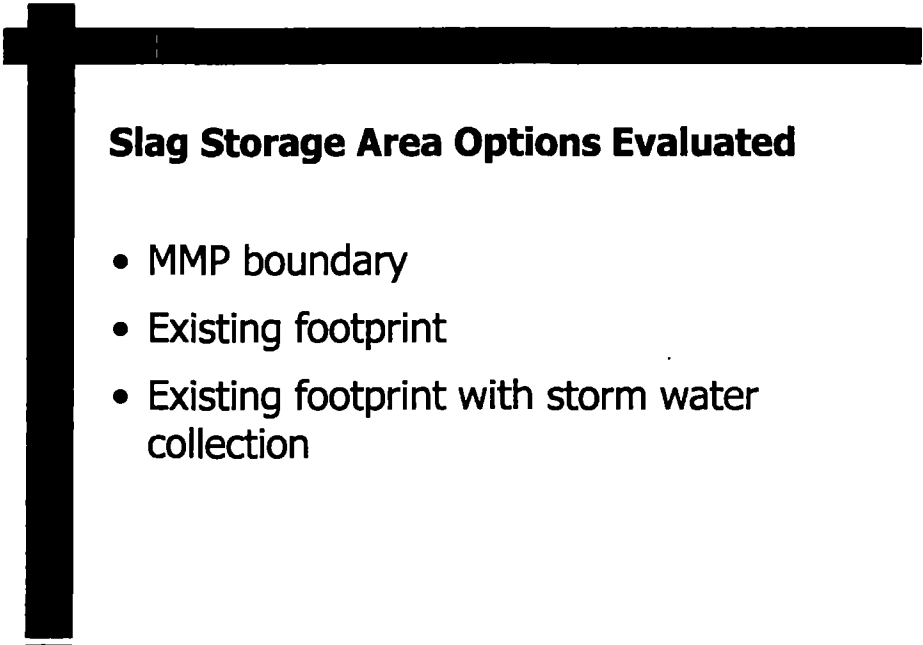
- DRC began using slag storage area during early 1940s
- Slag storage area is regulated by the Metallic Minerals Waste Management Act
- MDNR issued MMWM Permit No. MM-001 in 1991
- Main emphasis of permit is closure of slag storage area
- Permitted area covers approximately 40 acres
- Current operating area covers approximately 30 acres
- Storm water drainage area

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Doe Run Goals for Slag Storage Area

- Protect storage area from flooding
- Collect and treat storm water runoff from slag storage area during operation of storage area
- Stability and visual compatibility of slag storage area with surrounding area
- Minimize footprint of slag storage area in wetlands
- 30 to 35-year capacity for operational life of slag storage area



Slag Storage Area Options Evaluated

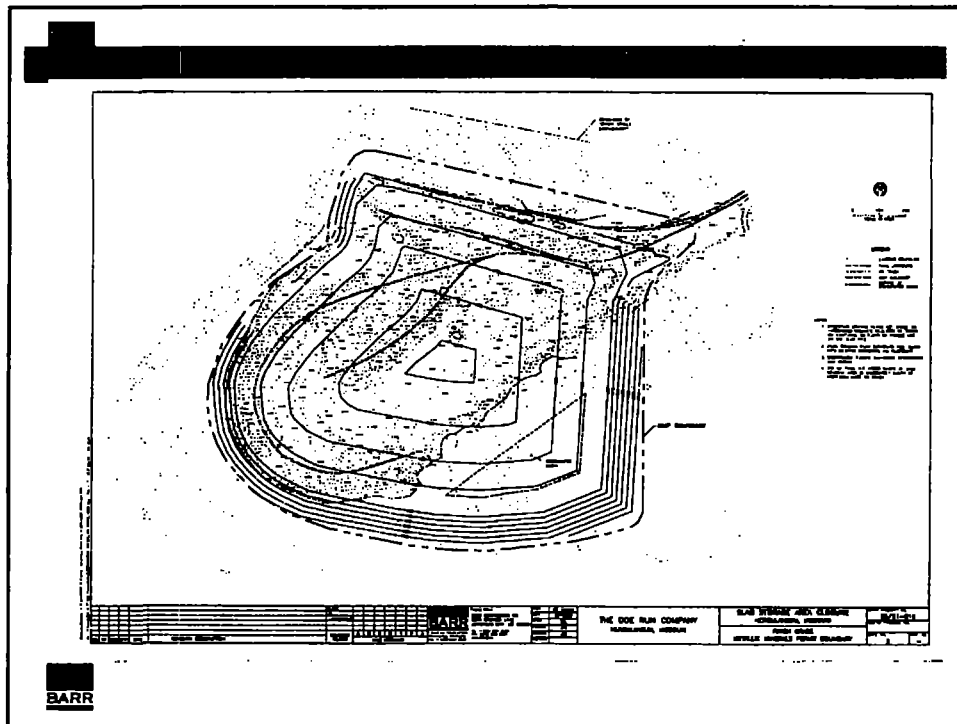
- MMP boundary
- Existing footprint
- Existing footprint with storm water collection

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MMP Boundary Option

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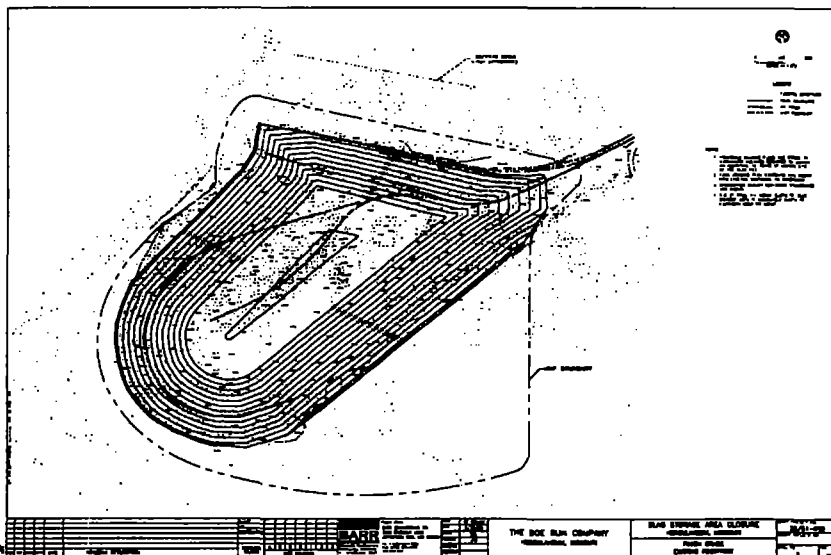


MMP Boundary Option

- **Advantages**
 1. Provides 30 to 35-year operational life
 2. Allows for construction of a 500-year flood protection berm
 3. Allows for construction of a storm water retention basin protected from flooding
 4. Provides good stability and visual compatibility with surrounding area utilizing a 30 to 35-year operational life
- **Disadvantages**
 1. Does not minimize expansion into wetlands area

Existing Footprint Option

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Existing Footprint Option

- Prevents further expansion of storage area footprint into wetlands area
- Provides for 30 to 35-year operational life of storage area

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Issues with Existing Footprint Option

- Does not lend itself to construction of a 500-year flood level berm and flood protection during operational life of slag storage area
- Does not allow for feasible collection of storm water runoff during operation of slag storage area
- Least stable and visually compatible with surrounding area utilizing a 30 to 35-year operational life

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Doe Run's Proposed Final Reclamation Remedy

- Develop a design for closure and remediation of the slag storage area that at a minimum, provides
 - Protection from 500-year flood elevation during operations and upon closure
 - Collect and treat storm water runoff during 30-35 year operational life of slag storage area
 - Minimize footprint expansion into wetlands area, and mitigate any impacted wetlands

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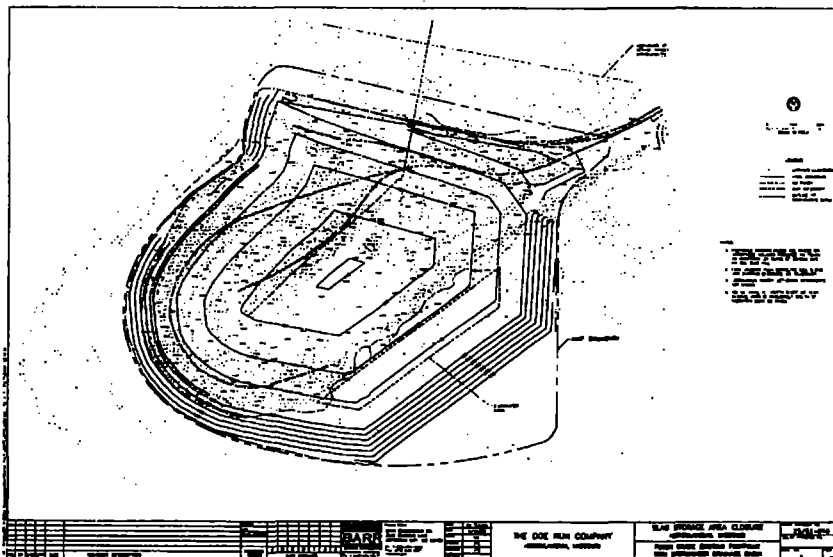
Overlap between MMP Boundary Permit and Existing Footprint Options

- Both provide 30 to 35-year operational life
- Both have 4:1 sideslopes
- Both have similar final closure standards
 - Synthetic liner
 - Two feet soil cover
 - Establishment of grass vegetation
 - Rip rap cover within 500-year flood elevation

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Existing Footprint with Storm Water Collection

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Existing Footprint with Storm water Collection

- 30 to 35-year operational life
- 500-year flood elevation berm to protect storage area during its operational life
- Construction of a storm water collection basin for slag storage area and adjoining Doe Run and City properties with a design capacity to accommodate a 10-year, 24-hour storm event
- Good stability and visual compatibility of slag storage area with surrounding area
- An additional 7 acres of wetlands area to be utilized with Doe Run to develop a compensatory wetlands area

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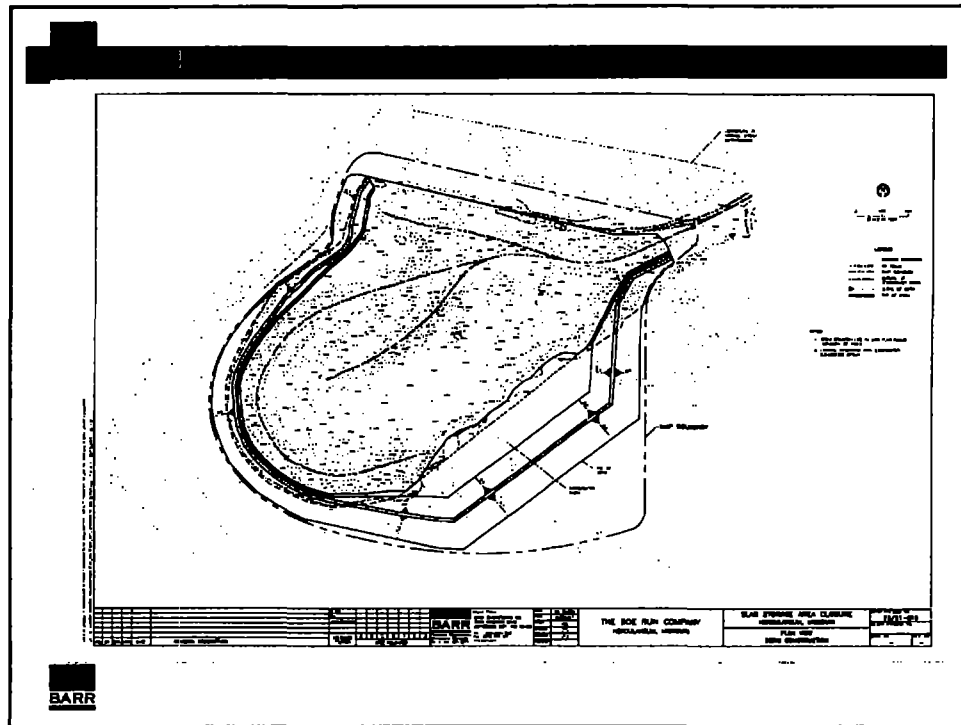
Benefits of Doe Run's Proposed Reclamation Remedy

- Allows for construction of a 500-year berm for flood protection during operational life and upon closure
- Allows for construction of a storm water retention basin, protected from flooding, and utilization of Doe Run's existing wastewater treatment plant
- Provides better stability and visual compatibility with surrounding area utilizing a 30 to 35-year operational life
 - Lower height and wider base
 - Lower elevation blends in better with city
 - Lower elevation allows application of soil cover and establishment of vegetation at an earlier date
- Although expansion of the slag storage area footprint into the wetlands area is minimized, rather than prevented, Doe Run will mitigate any impacted wetlands

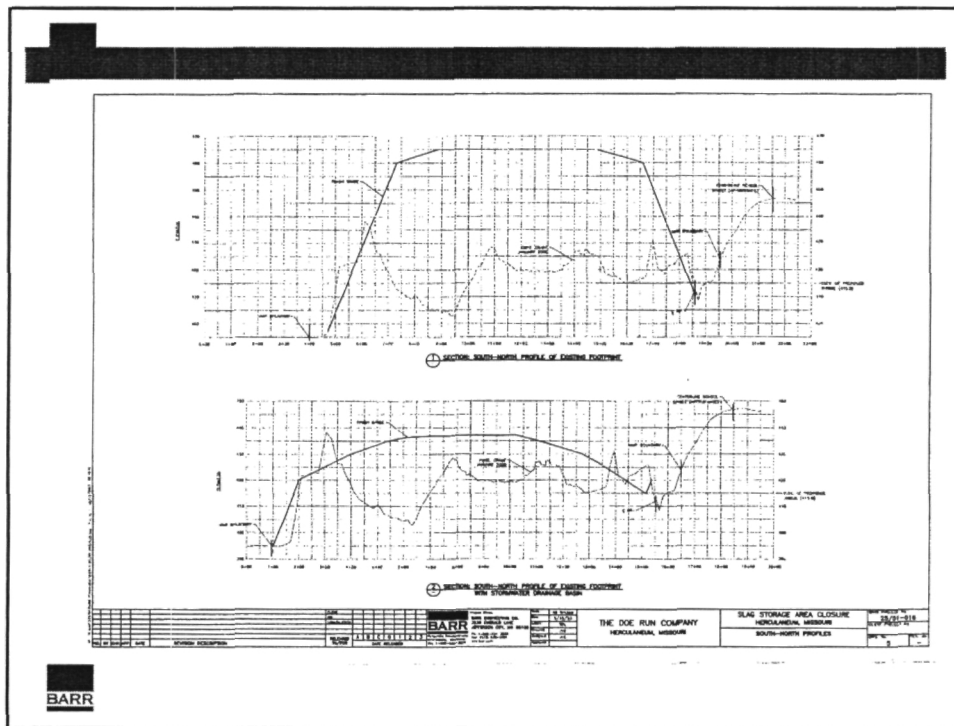
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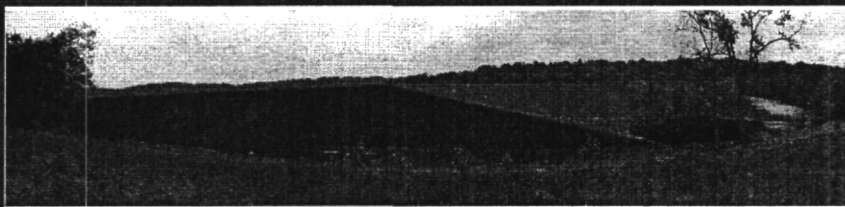




Stability and Visual Compatibility



Slag Storage Area – Existing Conditions
View from slope just south of Wood St.
Photographed 4 p.m. Friday, May 2, 2003 for
Barr Engineering and The Doe Run Company



Slag Storage Area – Existing Footprint Option
 Finish Grade – Slag Only
 View from slope just south of Wood St.



Slag Storage Area – Existing Footprint with Storm Water Collection Option
 Finish Grade – Slag Only
 View from slope just south of Wood St.

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Slag Storage Area – Existing Footprint Option
 Finish Grade – with final cover and grass
 View from slope just south of Wood St.



Slag Storage Area – Existing Footprint with Storm Water Collecting Option
 Finish Grade – with final cover and grass
 View from slope just south of Wood St.

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Conclusions

- Factors recommending existing footprint with storm water collection option over existing footprint option
 - Permanent solution with 500-year flood protection during operations and closure
 - Management of both City and adjoining Doe Run property storm water, in addition to slag storage area storm water
 - Recognition and mitigation of wetlands
 - Better stability and visual compatibility of slag storage area with surrounding area

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